Extinction and Endangerment

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June 26, 2014

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The Study of Food

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Introduction

Grade Level

These activities are intended for a sixth grade classroom.

Discipline

These activities have a science focus.

TEKS

Content:
To develop a rich knowledge of science and the natural world, students must become familiar with different modes of scientific inquiry, rules of evidence, ways of formulating questions, ways of proposing explanations, and the diverse ways scientists study the natural world and propose explanations based on evidence derived from their work. TEKS §112.18. Science, Grade 6. (a)(4)(A)(i)

Students will gain an understanding of the broadest taxonomic classifications of organisms and how characteristics determine their classification. The other major topics developed in this strand include the interdependence between organisms and their environments and the levels of organization within an ecosystem. TEKS §112.18. Science, Grade 6. (a)(4)(E)

Skills:
The student uses scientific inquiry methods during laboratory and field investigations. TEKS §112.18. Science, Grade 6. (b)(2)(B)

The student knows all organisms are classified into Domains and Kingdoms. Organisms within these taxonomic groups share similar characteristics which allow them to interact with the living and nonliving parts of their ecosystem. TEKS §112.18. Science, Grade 6. (b)(12)(A)(B)(C)(D)(E)(F)

National Education for Sustainability K-12 Student Learning Standards

2.1 ~ Interconnectedness ~ Interdependency
2.2 ~ Ecological Systems ~ Natural Resources ~ Biodiversity ~ Carrying Capacity ~ Environmental Stewardship
2.3 ~ Economic Systems ~ Resource Scarcity
3.1 ~ Personal Action ~ Problem Solving ~ Project Planning
3.2 ~ Collective Action ~ Structural vs. Personal Solutions

Extinction and Endangerment
Objective

Students will learn the impact of human actions on the depletion of plant and animal populations. They will learn that the endangerment or extinction of one species can affect an entire ecosystem. They will also learn about remedial actions, and steps they can take to rebuild an ecosystem and endangered populations.

Key Words

Ecosystem
Biodiversity
Endangered
Extinct
Food Web

Description of Activities

The following activities have been compiled to address the topic of “Extinction and Endangerment” in sixth grade classrooms. The activities meet the state and national education standards for sixth grade, and are intended to supplement pre-existing curricula, with a focus on integrating sustainability topics. The activities can be used in conjunction or alone.
Activities

Activity 1: Extinction in Ecosystems

Introduction

Have students define and describe a food web and ask them to describe the characteristics of an ecosystem. Ask students to explain how several elements of an ecosystem can be harmed even if only one element is initially affected. Make sure students understand that while some species may go extinct, some may run rampant (introduce the idea of carrying capacity, and how exceeding it can be detrimental to an ecosystem).

Materials

Index Cards
String
Red and Black Stickers

Products

One Page Paper Regarding Species Reintroduction
Extinct Species Presentation
Letter to Government

Process

1. Discuss ecosystems with students and identify the types of ecosystems that exist in your geographical area. Split students into groups, or have them individually decide on a local ecosystem for the whole class to study (e.g., forest, meadow, stream, pond, etc.). The teacher can provide a list for the students to choose from if the students are not familiar with the local ecosystems.

2. As an in-class exercise with students, brainstorm some of the animals and plants that make up that ecosystem. Have a student write everything on the board and have the class create links between the items that plants and animals eat and those that eat them. The result should be a complex food web (see example in the side bar).

3. Assign each student to a particular plant or animal that exists in a specified ecosystem. Have them research what it eats, what eats it, and any factors that are necessary for its survival. Have students present their findings to the class, in 5 minutes or less, modifying the existing food web as you go. Have students write a brief paper about their plant or animal.

4. Have students create a placard (index card) to identify themselves as a certain plant or animal. All students should start off with a green sticker on their placard, indicating that the population of their plant or animal species is healthy.
5. Facilitate an exercise in which one long piece of string connects each student with the person wearing a sign of the animal or plant that they eat. The result should be a tangled web of students, holding the string that’s connected to several different people.

6. Now, introduce some human-created scenarios that would affect this ecosystem (see examples below). When an animal or plant is affected, a red or black sticker must be placed on the person’s placard (red is endangerment, and black is extinction). For example, in a meadow ecosystem, a scenario might be that a farmer applies pesticides to the meadow, which kills off the Monarch Butterflies. Whoever is playing the role of the Monarch Butterfly would put a black sticker over top of the green sticker (and should be removed from the web). Students should be asked to identify what other species are affected by the disappearance of the Monarchs in this ecosystem. Those that are affected (that depend on the Monarch for food or that serve as prey for the Monarch) should place a red sticker over top of the green sticker, indicating the species is in trouble.

7. Introduce several detrimental scenarios until the students decide that the ecosystem is no longer viable and should be considered destroyed.

8. Sample Scenarios of Human Activities That Could Affect Ecosystems:
   - Pesticide-containing runoff makes its way into a stream from which animals drink.
   - A household dumps used oil in the storm drain, which empties out into a bay.
   - An old-growth forest is clear-cut.

9. Repeat the previous exercise, but this time use examples of recent human actions and efforts to make a positive impact on an ecosystem. For example, through the work of biologists and naturalists, the fox is reintroduced into an ecosystem and environmental groups help Congress to pass and enforce laws to protect its habitat. Have students research their specific piece of the web and write a page detailing their role in the reintroduction of the species, and the specific processes involved.

10. After the activity, present the class with a scenario that pits human activities against an ecosystem. Break the class into groups and assign different roles to the different groups. For example, one group could represent a developer that wants to fill in a wetland to build a shopping mall. Another group could represent a group of citizens of that community that want to save the wetland. Another group could represent the new workers who could benefit from jobs at the new mall. Students should be instructed to think of all the reasons why they would support or oppose the mall from their perspective and have a mini-debate about the issue. Have students draft a mock letter to their local government supporting or opposing the building of the mall.

11. Give the students a list of species that have become extinct in the last 100 years and ask them to research how they became extinct (e.g., overharvesting, habitat destruction) and present the information to the class, along with a description of the species and/or a photograph. This will help the class appreciate the beauty of many of the extinct species and gain an understanding of the human activities that caused their demise.

Additional Resources

Online Resources

Primary Resource
http://www.epa.gov/wastes/education/quest/quest/pdfs/sections/unit1.pdf

Reference Resources
http://www.lisd.org/technology/itswebs/elem/eco/dir.htm
http://www.lisd.org/technology/itswebs/elem/eco/resindex.htm
http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_bk_w7000_0030.pdf
http://wwf.panda.org/what_we_do/endangered_species/tigers/last_of_the_tigers/what_if_tigers_did_become_extinct/

Educational Literature

“And Then There Was One: The Mysteries of Extinction” (Sierra Club Books) by Margery Facklam

“Face to Face with Manatees” (Face to Face with Animals) by Brian Skerry

“Where Have All the Pandas Gone? Questions and Answers About Endangered Species” by Melvin and Gilda Berger
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